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ROCKY MOUNTAIN FOREST AND RANGE EXPERIMENT STATION

FOREST SERVICE

U. S. DEPARTMENT OF AGRICULTURE

# FOREST INSECT CONDITIONS IN NEW MEXICO AND ARIZONA

## As Revealed By Detection Surveys During 1953

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# REGIONAL FOREST INSECT CONDITIONS IN BRIEF

The timbered areas of New Mexico and Arizona suffered less as a result of attacks by forest insects during 1953 than was the case during 1952. However, tree mortality caused by bark beetles, and damage to fir and spruce timber stands as a result of spruce budworm defoliation was severe in several areas throughout both states during the year.

Following are the highlights of the Regional forest insect conditions during the year.

1. The southwestern pine beetle and associated bark beetle species were responsible for a majority of the loss of pine timber in both states. The heaviest tree-killing occurred in northern and central New Mexico, although loss rates above endemic levels also were noted in the Capitan Mountains of southern New Mexico and on portions of the Navajo Indian Reservation in Arizona.

2. The Douglas-fir beetle caused heavy loss in scattered stands of Douglas-fir timber regionwide, but these isolated infestations are not serious due to the small acreage of host type in the local areas.

3. The spruce budworm occurred in near epidemic proportions in most all of the mixed conifer stands throughout both states, but budworm infestations were found to be most severe in the fir and spruce timber in northern New Mexico.

4. Infestations of the fir engraver beetle have continued in epidemic proportions in many localities and, because of tree-weakening as a result of budworm defoliation, it can be expected that this insect will continue to cause heavy tree-killing in some areas during 1954.

5. The Great Basin tent caterpillar occurred in outbreak numbers over large areas of aspen stands in northern New Mexico, but except for defoliation in areas heavily used for recreation, infestations by this insect are not of primary importance.

6. The infestation of the New Mexico fir looper in a portion of the Sacramento Mountains is no longer active. The Circle Cross fire burned over a major portion of this infested area and a fungous disease affecting the pupae killed the insect in the area outside of the burn.

7. The Engelmann spruce beetle caused very little damage to spruce timber stands during the year. Field surveys revealed that the infestation centers noted in Arizona and New Mexico during 1952 had been abated by natural causes and losses currently are at a low endemic level.

## THE REGIONAL FOREST INSECT SURVEY PROGRAM

### Ground Surveys

The prompt detection of insect outbreaks in their early stages is the most essential phase of the regional forest insect survey program as early detection enables prompt suppression before extensive damage has occurred. In as much as the local forest manager is able to maintain constant surveillance of timberlands under his jurisdiction throughout the course of the year, major dependence in the detection of abnormal insect damage necessarily is placed on the forest land-owner or land-managing agency. Upon receipt of initial detection reports of abnormal forest insect conditions, personnel of the Forest Insect Laboratory are prepared to inspect the infested areas to evaluate the conditions of loss. In the event that incipient infestations are in need of direct artificial action for control, a systematic survey is made to appraise the exact control needs. Reports of these surveys, including recommendations for control, are prepared for the information of all persons concerned as promptly as possible upon completion of the field work. Further assistance regarding the details of prescribed measures and timing of control measures also is furnished as an aid in planning for the control operation.

Forest insect detection reports were received from many of the cooperating agencies during 1953. In each case, action was taken on the reports received in the manner described above. The survey findings which followed receipt of the initial detection reports and the action programs considered necessary for control during 1954 are described in this report.

### Aerial Reconnaissance

As a supplement to the program of surveys as described above, an aerial reconnaissance of the timberlands within the region is made annually to detect abnormal insect activity which may have escaped notice by cooperating personnel during the course of the year. This annual aerial reconnaissance also provides opportunity to appraise the scope and intensity of reported outbreaks, thus insuring that spread of infestations have not been overlooked. The aerial phase of the regional survey program during 1953 was conducted in late September and early October through cooperation with the Aircraft and Special Equipment Center, a Division of the Bureau of Entomology & Plant Quarantine, located in Oklahoma City, Oklahoma. The Equipment Center provided the services of an expert pilot and furnished a suitable plane for this phase of the survey work. Representatives of the forest land-managing agencies accompanied the aerial survey crew on each reconnaissance flight in order to facilitate a systematic coverage of each area and to appraise the condition of insect infestations in areas under their jurisdiction. During the course of aerial inspection of the regional forested areas, a few infestations were detected which had not been reported previously.

STATUS OF MAJOR INSECT PESTS DURING 1953

1. The southwestern pine beetle (Dendroctonus barberi).

Survey results indicate that this insect, and associated bark beetle species, has been responsible for the major portion of tree-killing in ponderosa pine throughout the 6.3 million acres of pine timber type in the Region. This loss, predominantly in virgin stands, occurs primarily as scattered individual trees, but concentrations of heavier killing occur in several areas in northern and central New Mexico.

2. Black Hills beetle (Dendroctonus ponderosae).

The Black Hills beetle was found in outbreak numbers only in one area during the course of the year. This outbreak currently is restricted to approximately 1800 acres on a portion of the Carson National Forest in northern New Mexico.

3. Douglas-fir beetle (Dendroctonus pseudotsugae).

A noticeable increase in Douglas-fir beetle activity is reflected by an upward trend in Douglas-fir losses throughout the region. Especially heavy losses occurred this year in local areas in northern and southeastern New Mexico and in northern Arizona. However, due to the restricted nature of the Douglas-fir stands in this area and the inaccessability of most areas suffering heavy damage, the current outbreaks have not reduced seriously the usable volume of Douglas-fir timber in the Region.

4. Engelmann spruce beetle (Dendroctonus engelmanni).

Tree-killing in spruce stands as a result of attacks by the Engelmann spruce beetle were found to be at a low ebb in New Mexico and Arizona during the year. Surveys revealed that natural control factors had reduced spruce beetle populations to a low endemic level in the White Mountains of eastern Arizona and the San Pedro Mountains of northern New Mexico. Aerial reconnaissance of other spruce areas failed to disclose further indications of abnormal spruce beetle activity.

5. The spruce budworm (Choristoneura fumiferana)

Infestations of spruce budworm in varying degrees of intensity occur over large areas of mixed-conifer forest type in portions of both New Mexico and Arizona. These infestations are most severe in northern New Mexico. At present, principal damage to trees as a result of defoliation is being sustained by the understory. However, the mature stand also is attacked and tree-killing in the merchantable-size classes is beginning to occur.

On the basis of recent surveys, it was found that the budworm infestation at the North Rim, Grand Canyon National Park, declined during 1953. It is expected that further and more rapid decreases in this infestation will take place as natural control factors become more effective on the declining population.

6. The fir engraver beetle (Scolytus ventralis).

A fir engraver beetle infestation of several years' duration continues in outbreak proportions in the Sandia Mountain recreational area in central New Mexico. Surveys during 1953 revealed that the infestation is general throughout the white fir stands in this area and is causing a serious depletion of the forest cover.

7. Great Basin tent caterpillar (Malacosoma fragilis).

Continued heavy defoliation of aspen and cottonwood resulted from the feeding of tent caterpillars in northern New Mexico, and to some extent in Arizona. While most of the damage occurred in remote places, several areas devoted to recreational use in northern New Mexico, as well as the scenic strip along the main entrance road to the North Rim, Grand Canyon National Park, suffered heavy defoliation. As yet, tree killing as a result of caterpillar feeding is not severe, but without protection it is possible that aspen and cottonwood on many of the recreational areas might be seriously depleted.

## CONTROL ACTION NEEDED DURING 1954

Despite the normal decline in damage caused by bark beetles over a majority of the pine stands in the Region, and the abatement of the fir looper outbreak in the Sacramento Mountains of southern New Mexico during the year, direct artificial control action is needed during 1954 to suppress a new outbreak of Black Hills beetle in northern New Mexico as well as a few previously known defoliator infestations which have persisted in local areas and become increasingly destructive.

The needs of direct artificial measures for control of insect pests during 1954 are based on due consideration of the forest resource value to be protected and the loss and damage which could be expected in the absence of direct control efforts. In areas where timber loss resulting from insect attack is not of outbreak proportions, suppression of infestations will be made by salvaging the infested trees in conjunction with, or in addition to, normal timber sales operations.

1. Black Hills beetle.

   Control of the Black Hills beetle outbreak on the Tres Piedras Ranger District of the Carson National Forest is considered necessary to prevent further killing of ponderosa pine in the area of current infestation, and to protect adjacent pine timberlands from damage. Surveys indicate that treatment of 300 currently infested trees on an area of 1,800 acres will be required to suppress this outbreak.

2. Spruce budworm.

   The spruce budworm has caused heavy defoliation of mixed fir and spruce stands in many areas throughout both states during the past few years. Considerable mortality of understory trees and top-killing in the overstory has occurred as a result of cumulative defoliation, and measures for control are needed to prevent killing in merchantable-sized trees. The areas urgently in need of control during 1954 occur on or adjacent to the Santa Fe, Cibola, and Lincoln National Forests in New Mexico. Action should be initiated on 3,100 acres of infested area in the vicinity of Pepper Canyon, Sacramento Division of the Lincoln National Forest; 2,700 acres at Sandia Crest, Cibola National Forest; and 41,000 acres of private and Federal lands in and adjacent to the Santa Fe and Carson National Forests.

3. Great Basin tent caterpillar.

Direct artificial measures for control of tent caterpillars are deemed necessary only in local areas heavily used for recreation. The largest areas in need of control are the campgrounds, stream courses, and other recreational developments on portions of the Carson and Santa Fe National Forests. Other recreational areas where control of tent caterpillar is needed are: North Rim, Grand Canyon National Park; Aztec Ruins; and Montezuma Castle National Monument.

4. Fir engraver beetle.

Despite the epidemic nature of the fir engraver beetle infestation in the Sandia Recreational Area, direct artificial measures for control are not recommended for 1954. The control efforts that were directed against this outbreak during the spring months of 1953 fell short of accomplishing desired results and the infestation has now spread throughout all adjacent fir stands in the area. Recommendations for additional action are being withheld pending development of more economical control methods than are now available.

5. Walnut caterpillar.

Preservation of the Texas black walnut trees in an area along the main entrance road to Carlsbad Caverns National Park is deemed necessary as these trees are annually defoliated by several generations of caterpillars, and in lieu of control, this vegetation is likely to be killed.

CONTROL NEEDS DURING 1954

NEW MEXICO AND ARIZONA

| | Project and Location | Insect | Extent of Treatment Acres | Extent of Treatment Trees | Host Species Affected | Control Method Recommended |
|---|---|---|---|---|---|---|
| 1 | Pinabetal Mesa<br>Carson N.F. | Black Hills beetle | 1,800 | 300 | Ponderosa pine | Toxic oil spray |
| 2 | Pepper Canyon<br>Lincoln N.F. | Spruce budworm | 3,100 | --- | Douglas-fir<br>White fir<br>Douglas-fir | DDT-aerial spray |
| 3 | Sandia Crest<br>Cibola N.F. | Spruce budworm | 2,700 | --- | White fir<br>Engelmann spruce | DDT-aerial spray |
| 4 | Bland Division<br>Santa Fe N.F. | Spruce budworm | 14,000 | --- | Douglas-fir<br>White fir | DDT-aerial spray |
| 5 | Jemez Division<br>Santa Fe N.F. | Spruce budworm | 27,000 | --- | Douglas-fir<br>White fir | DDT-aerial spray |
| 6 | Taos<br>Carson N.F. | Tent caterpillar | 1,500 | --- | Aspen<br>Cottonwood | DDT-aerial spray and mist blower |
| 7 | Pecos<br>Santa Fe N.F. | Tent caterpillar | 500 | --- | Aspen<br>Cottonwood | DDT-aerial spray and mist blower |
| 8 | North Rim<br>Grand Canyon N.P. | Tent caterpillar | 500 | --- | Aspen | DDT-mist blower |
| 9 | Carlsbad<br>Carlsbad Caverns N.P. | Walnut caterpillar | 400 | --- | Texas black walnut | DDT-mist blower |
| 0 | Montezuma<br>Montezuma Castle N.M. | Lacebug | 250 | --- | Sycamore | DDT-mist blower |
| 1 | Aztec<br>Aztec Ruins Nat. Mon. | Tent caterpillar | 50 | --- | Cottonwood | DDT-mist blower |

# FOREST INSECT SURVEY

NEW MEXICO & ARIZONA

1953

MOHAVE
COCONINO
NAVAJO
APACHE
WILLIAMS
FLAGSTAFF
PRESCOTT
YAVAPAI
MARICOPA
PHOENIX
YUMA
PINAL
GILA
SPRINGERVILLE
GREENLEE
GRAHAM
PIMA
TUCSON
COCHISE
SAN JUAN
RIO ARRIBA
MC KINLEY
GALLUP
SANDOVAL
ALBUQUERQUE
VALENCIA
BERNALILLO
TORRANCE
SANTA FE
LOS ALAMOS
TAOS
UNION
COLFAX
MORA
SAN MIGUEL
QUAY
GUADALUPE
CURRY
DE BACA
ROOSEVELT
LINCOLN
CHAVES
CATRON
SOCORRO
GRANT
SILVER CITY
SIERRA
ALAMOGORDO
LEA
EDDY
DONA ANA
OTERO
LUNA
HIDALGO

0 30 60 90

LEGEND

Timbered Lands

- Ponderosa Pine
- Mixed Conifer
- Spruce - Fir
- Open
- (1) Areas Needing Control Action in 1954

## FOREST PEST STUDY AND ACTION COMMITTEE

The increased emphasis in recent years to suppress and control forest insects and disease pests throughout the Nation has resulted in a need for regional committees to appraise and coordinate the annual forest pest control programs. The formation of a forest pest study and action committee for New Mexico and Arizona was decided upon at the annual meeting of the Arizona-New Mexico Forest Practices Committee in mid-June. It was agreed at this meeting that membership in the newly-formed committee would include the principals of all Federal and State land-managing agencies, the private forest land-owners, major timber operators, and any other individuals in the Region interested in the forest pest problems of the two states. It was further agreed that this newly-formed pest study and action committee should meet at least once each year, preferably at the conclusion of the regional surveys during the fall months, to appraise forest pest conditions as revealed by survey findings and consider the desirable action program needed to suppress outbreaks of forest pests.

## FURTHER NEEDS

Analysis of the requirements for adequate forest insect control in New Mexico and Arizona reveals that the present survey and control organization should be strengthened along two major lines, namely: (1) cooperative detection of insect outbreaks, and (2) research leading to improved survey and control techniques. Intensified cooperation in the detection of incipient forest insect outbreaks by forest land-owners and forest land-managing agencies is a prerequisite to the effective reduction of regional insect-caused losses. Further training of forest officers in the recognition of destructive forest insects and their damage is needed to implement the detection phase of the regional forest insect survey program. Plans are being made to accelerate this training effort during the coming year.

Research dealing with life histories, habits, and methods of controlling forest insect pests in this region, as well as improving survey techniques for appraising their damage, has been limited in the past and, in lieu of detailed information relating to these subjects, control is based on methods developed elsewhere. Localized research is needed vitally in New Mexico and Arizona to determine the most effective methods of surveying and controlling forest insect damage and to develop new techniques better suited to regional conditions. It is felt that with prompt detection of forest insect outbreaks and a firm foundation of research information on which to base control recommendations, the annual losses caused by forest insect pests in the Southern Rockies can be reduced materially in future years.

## CONTROL ACCOMPLISHMENTS DURING 1953

The action program for control of forest insect pests in New Mexico and Arizona during 1953 was based on needs as determined by field surveys in 1952. Some modifications in the planned control programs were made to meet changes in the status of pests as needs became apparent during the course of the early spring months.

1. Black Hills beetle.

Control of a Black Hills beetle outbreak on 6,160 acres of pine timberlands in the vicinity of Big Horn Peak, Tres Piedras Ranger District, Carson National Forest, was completed in June. Field surveys during October in and adjacent to the area given benefit of control treatment revealed that the control program had successfully reduced this outbreak to a low level.

2. Spruce budworm.

Aerial spraying for control of the spruce budworm was conducted in mid-June on 3,500 acres of spruce-fir timber on the Mt. Taylor Division of the Cibola National Forest. A survey of this area subsequent to control revealed that the spray application was effective in reducing the spruce budworm population by at least 95%. Suppression of an outbreak of Great Basin tent caterpillars on aspen interspersed with spruce-fir timber in the control area was also accomplished by this spray program.

3. Fir engraver beetle.

Survey results indicate that efforts directed at the control of the fir engraver beetle in the Sandia Mountains, Cibola National Forest, were not successful in eliminating further beetle-caused losses of white fir in this area. A salvage logging operation, planned as a supplement to toxic oil treatment of the infested trees, was abandoned by the logging contractor after removal of only a small fraction of its estimated capacity, with the result that the direct control phase of the project was increased by nearly 50%. Insufficient time and funds were available to treat more than a portion of these additional infested trees prior to the advent of the beetle flight in late June. Incomplete coverage of the epidemic area, coupled with further spread of the beetles during 1953, reduced the effectiveness of this project to a low level.

4. Great Basin tent caterpillar.

Control of tent caterpillar infestations on several areas devoted to recreational use in New Mexico and Arizona was undertaken during the year. Control was accomplished by mist-blower application of DDT on the Taos and Penasco Ranger Districts, Carson National Forest; at North Rim, Grand Canyon National Park; and in headquarters area at Montezuma Castle and Aztec Ruins National Monuments.

5. Walnut caterpillar.

Multiple application of DDT spray was effective in preventing defoliation of Texas black walnut trees along the main entrance road at Carlsbad Caverns National Park.

1953 CONTROL ACCOMPLISHMENTS

NEW MEXICO AND ARIZONA

| Project and Location | Insect | Extent of Treatment | | Host Species Affected | Control Method Used |
|---|---|---|---|---|---|
| | | Acres | Trees | | |
| 1 La Madera Cibola N.F. | Fir engraver beetle | 1,200 | 4,275 | White fir | Toxic oil spray |
| 2 Mt. Taylor Cibola N.F. | Spruce budworm | 3,500 | ----- | True firs & Spruce | DDT-aerial spray |
| 3 Big Horn Carson N.F. | Black Hills beetle | 6,160 | 261 | Ponderosa pine | Toxic oil spray |
| 4 Taos-Penasco Carson N.F. | Tent caterpillar | 6,300 | ----- | Aspen Cottonwood | DDT-mist blower |
| 5 North Rim Grand Canyon Nat'l. Pk. | Tent caterpillar | 500 | ----- | Aspen | DDT-mist blower |
| 6 Bandelier Nat'l. Monument | Tent caterpillar | 300 | ----- | Cottonwood | DDT-aerial spray |
| 7 Carlsbad Nat'l. Park | Walnut caterpillar | 400 | ----- | Walnut | DDT-mist blower |
| 8 Montezuma Castle Nat'l. Monument | lacebug | 250 | ----- | Sycamore | DDT-mist blower |
| 9 Aztec Ruins Nat'l. Monument | Fall webworm | 100 | ----- | Willow | DDT-mist blower |